ABSTRACT

Measuring System with Sweeping Comb Filter and Multiplexer

High-resolution measurement of a parameter is provided at multiple different locations simultaneously along an optic fiber. Light within a predefined range of wavelengths is transmitted into an optic fiber that contains multiple birefringent fiber optic pressure transducers, each including a Fiber Bragg Grating. Each grating defines a spatially modulated index of refraction and a wavelength that is unique within the system. A sweeping comb filter is used to apply optical comb filtering to light reflected from the transducers so as to pass filtered light having multiple spectral portions, each spectral portion associated with one transducer. The free spectral range of the sweeping comb filter is set to be approximately equal to the spectral range of a single spectral portion. Wavelength division multiplexing is applied to the filtered light so as to separate the spectral portions. The value of a parameter is preferably determined using the spectral spacing of two maxima of spectral intensity in each spectral portion.